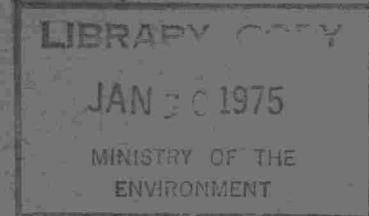


# SUDBURY

OPERATING SUMMARY

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REGIONAL OPERATIONS**

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REGIONAL OPERATIONS DIVISION

**DIRECTOR, NORTHEASTERN REGION**  
R. Moore

**MANAGER, UTILITY OPERATIONS**  
J. Wesno

**SUDBURY**

**WATER POLLUTION CONTROL PLANT**

**Operated for the**

**CITY OF SUDBURY**

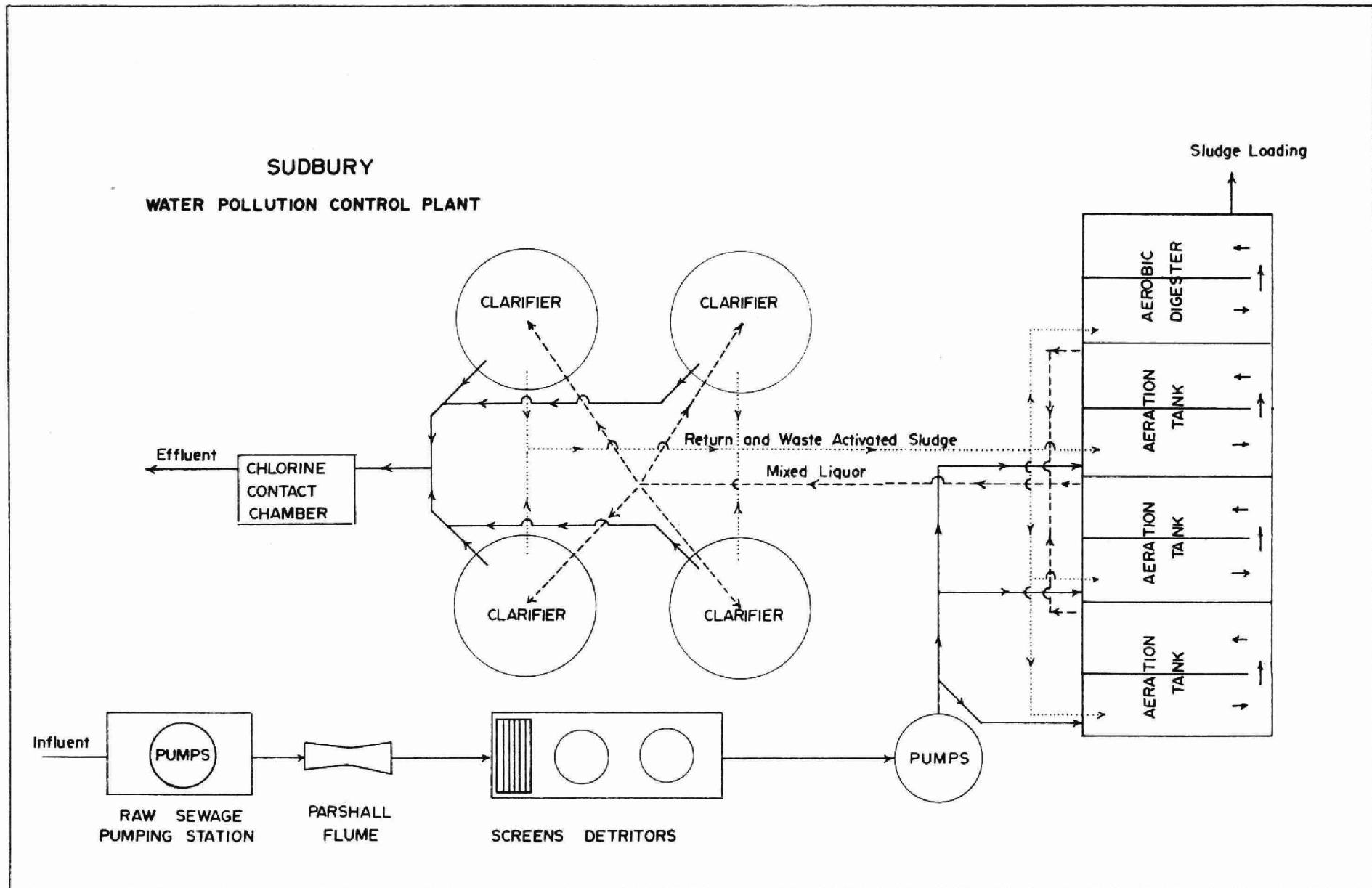
**by the**

**MINISTRY OF THE ENVIRONMENT**

**1973 ANNUAL OPERATING SUMMARY**

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## DESIGN DATA

Project No: 2-1002-72  
Design Flow: 15 MIGD  
Design BOD 95 mg/l  
Design SS 139 mg/l

### RAW SEWAGE PUMPS

(at pumping station)

Three CANADA PUMPS: Type: 14 DSV,  
Capacity: (each) 9000 USGPM at 93' TDH  
Two CANADA PUMPS: Type: 10RSLV,  
Capacity: 4400 USGPM at 94.5 TDH

### BAR SCREENS:

Two, LINK-BELT Mechanical Bar Screens  
4' x 6' Bars on 2.5" centres

### DETRITOR

30' dia. x 2.2' swd  
Type: DORR-OLIVER LONG

### RAW SEWAGE PUMPS

(at plant)

Three, WORTHINGTON  
Capacity (each) 13,440 USGPM at 28' TDH

### AERATION TANKS:

Three, 132.5' x 48' x 15' swd (2-pass)  
Volume (total) 1,786,000 I. Gal.  
Detention: 2.9 hours  
Blowers: Four, SPENCER TURBO  
Capacity each: 10,400 ft<sup>3</sup>/min. at 8.5 psi

### FINAL CLARIFIERS

Four, 110' dia. x 12.5' swd  
Mechanism: DORR-OLIVER LONG  
Volume: (total) 3,000,000 I. Gal.  
Detention: 4.7 hours  
Surface overflow rate: 416 gal/ft<sup>2</sup>/day

### RETURN SLUDGE PUMPS:

Three WORTHINGTON  
Capacity (each): 6100 gpm at 51' TDH  
One WORTHINGTON  
Capacity : 840 gpm at 32' TDH

### AEROBIC DIGESTER

One, 132.5' x 48' x 15' swd (two-pass)  
Volume (total) 595,000 I. Gal.

### CHLORINATORS:

One, FISHER AND PORTER  
Type: 70-4500  
Capacity: 8000 lb/day  
One, FISHER AND PORTER  
Type: 71-V1006  
Capacity: 400 lb/day

### CHLORINE CONTACT CHAMBER:

139' x 30' x 12.5'  
Volume: 325,000 I. Gal.

### LAGOONS

One, Area: 1 acre

# '73 Review

## GENERAL

The Sudbury WPCP is a high rate 15 M.I.G.D. activated sludge plant with a first-stage raw sewage pumping capacity of 43.2 M.I.G.D.

The main pumping station was completely flooded in January due to a discharge line failure and was out of operation for a period of 3 days. Fortunately, the station failure occurred during a low flow period and there were no sewer "back-ups" or basement floodings.

Numerous failures of the clarifier drive mechanisms were experienced during the winter. These were directly attributed to substantial accumulations of moisture in the drive units which froze and rendered the units inoperable. This problem was overcome by the use of heaters, protective weather shields, and a glycol/oil mixture in the gearboxes.

The sludge lagoons caused severe odour problems during the summer months. These odours were attributed to the large amounts of grease and sludge pumped into the lagoons during the initial start-up period. The lagoons have since been taken out of service and will be utilized for temporary sludge storing only in the event of a dire emergency.

Every air blower failed shortly after the plant was put into operation. The failures were due to faulty bearings which were eventually replaced under warranty.

An agreement was made with International Nickel Company to dispose of waste digested sludge on the tailings area. The sludge was used on areas that were being vegetated as a soil conditioner.

A research program with Laurentian University was initiated during the year to fully evaluate the effects of the digested sludge on mine tailings. The program will continue into 1974 and perhaps 1975.

The low treatment efficiency at the plant was attributed to the many process upsets caused by mechanical equipment failures. It is expected that there will be a substantial improvement in the treatment efficiency in 1974 when most of the construction deficiencies will have been rectified.

## EXPENDITURES

The total operating cost for 1973 was \$374, 769.

## PLANT FLOW AND CHLORINATION

The total flow for 1973 was 3, 991 million gallons which represents an average daily flow of 10. 93 M.I.G.D.

A total of 2, 900 lb. of chlorine was used to disinfect the final effluent from August to November 24, 1973, representing an average dosage of 2. 7 mg/l.

## PLANT EFFICIENCY

The average BOD concentrations in the raw and treated sewage were 140 mg/l and 33 mg/l respectively. This represents a removal efficiency of 76% which is substantially below the expected efficiency of 90%.

The average SS concentrations in the raw and treated sewage for 1973 were 160 mg/l and 16 mg/l respectively representing a removal efficiency of 84 per cent.

## AERATION

The average MLSS concentration in the aeration section was 5, 500 mg/l. The average organic loading to the aeration section was 0.23 pound of BOD per day per pound of mixed liquor suspended solids.

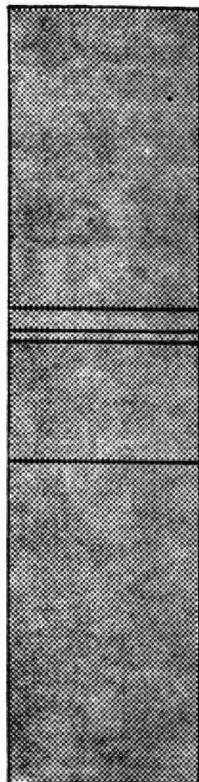
## SLUDGE DIGESTION & DISPOSAL

A total of 22, 098 cubic yards of aerobically digested sludge was hauled from the aerobic digester from August to December with an average suspended solids concentration of 2.9 per cent.

## CONCLUSIONS

The low treatment efficiency was attributed to the numerous mechanical failures experienced during the first full year of operation. It is anticipated that there will be a substantial improvement in efficiency and a considerable reduction in mechanical failures in 1974 as experience is gained by the field staff and the numerous construction deficiencies are corrected.

# ANNUAL COSTS



## 1973 OPERATING COSTS

- SALARIES & WAGES 38 %
- EMPLOYEE BENEFITS 2 %
- TRANSPORTATION & COMMUNICATIONS 1 %
- SERVICES 15 %
- SUPPLIES & EQUIPMENT 44 %
- AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS NIL
- TRANSFER PAYMENTS NIL
- OTHER TRANSACTIONS NIL

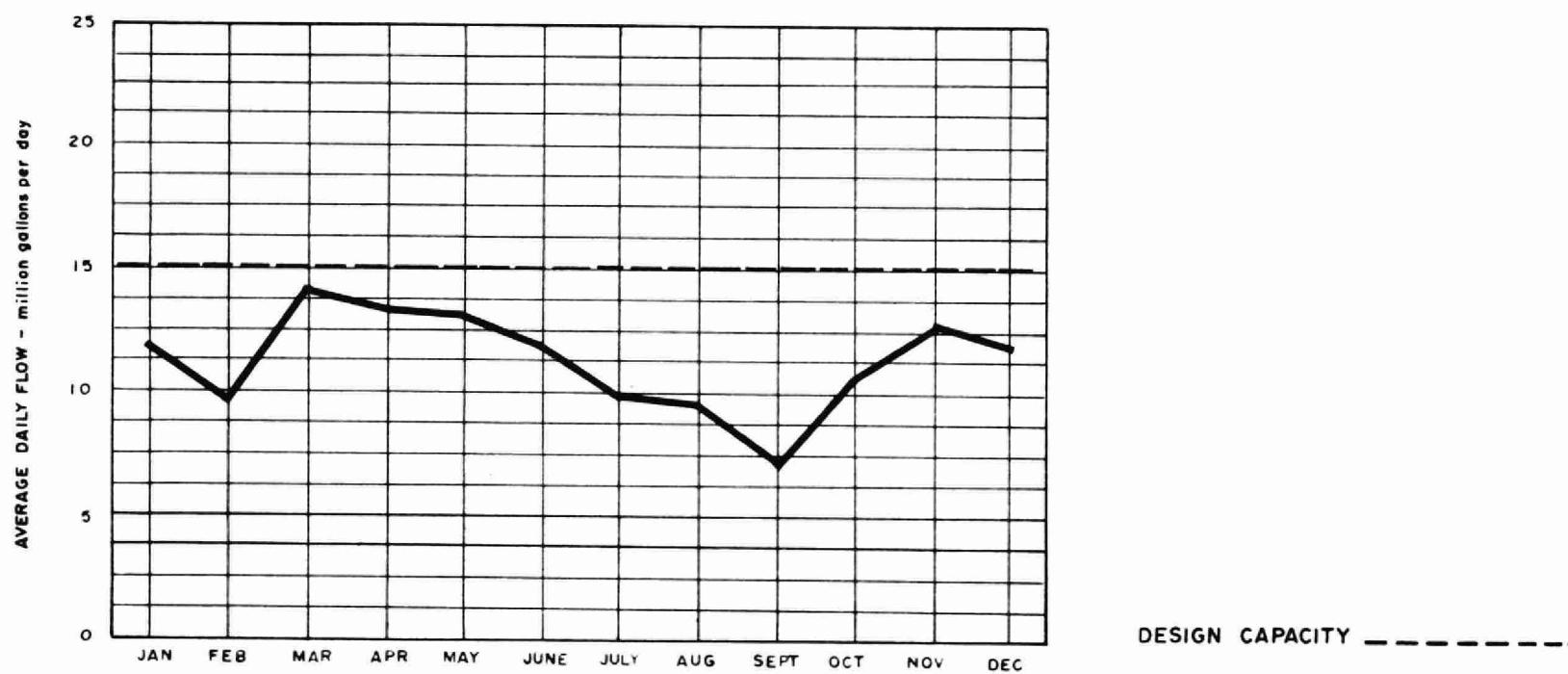
## YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS	
			\$/M.G.	t/lb BOD
1973	3991	\$ 374,769	94	6

## OPERATING EXPENDITURES

SALARIES AND WAGES	\$142, 549
EMPLOYEE BENEFITS	6, 713
TRANSPORTATION & COMMUNICATIONS	3, 476
SERVICES	56, 202
SUPPLIES AND EQUIPMENT	165, 829
ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	0
TRANSFER PAYMENTS	0
OTHER TRANSACTIONS	0
TOTAL	\$374, 769

# PROCESS DATA FLOWS

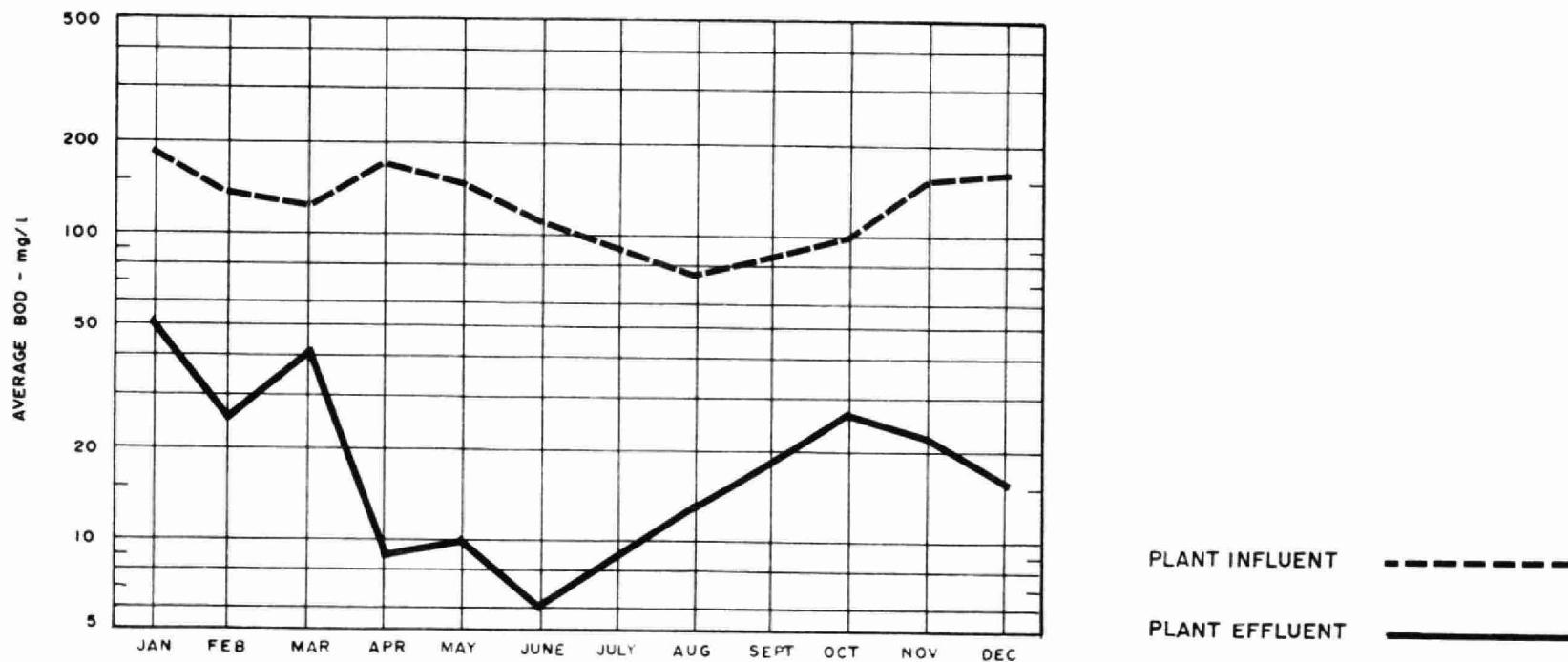
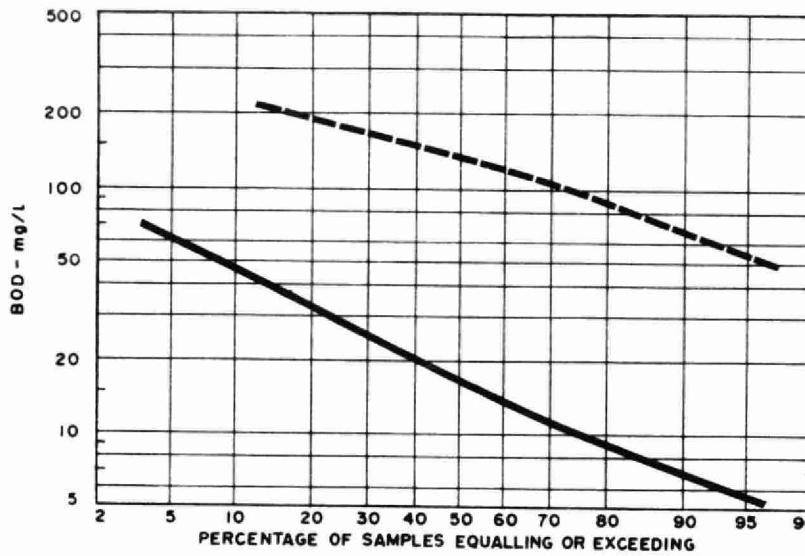


## PLANT PERFORMANCE

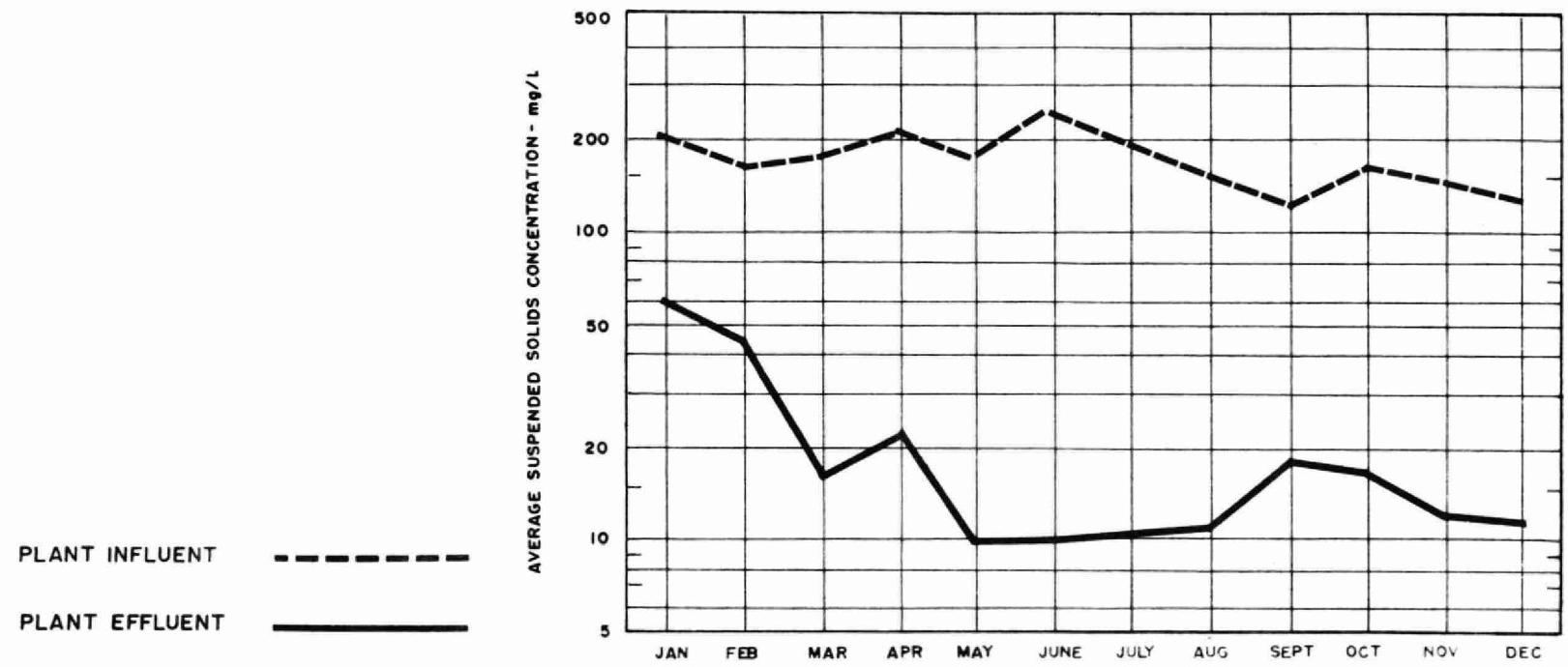
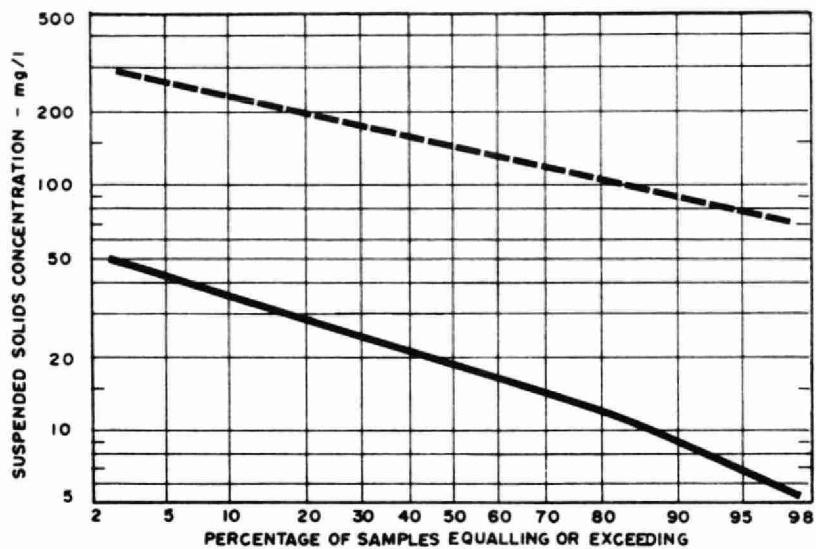
MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW million gallons	AVERAGE DAY mil. gal	MAXIMUM DAY mgd	INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l P	EFFLUENT mg/l P
						%	$10^5$ pounds			%	$10^5$ pounds		
JAN	170*	11.3	18.5	200	50	74	2.5	200	60	71	2.5	9.0	6.4
FEB	278	9.9	11.0	140	26	81	3.2	160	45	73	3.3	10.0	5.3
MAR	437	14.1	17.2	130	42	67	3.8	180	17	91	7.1	7.9	2.5
APR	408	13.6	17.6	180	9	95	7.0	210	23	89	7.8	13.0	4.0
MAY	409	13.2	18.8	150	10	93	5.7	180	10	94	7.0	6.2	0.6
JUNE	345	11.5	17.8	110	6	95	3.6	250	10	96	8.3	6.9	1.2
JULY	311	10.0	11.0										
AUG	304	9.8	13.4	75	13	83	1.9	160	11	93	4.6	4.7	1.5
SEPT	237	7.9	9.9					130	19	85	2.6		
OCT	336	10.8	14.2	98	27	72	2.4	170	18	89	5.0	5.3	3.2
NOV	383	12.8	15.1	150	22	86	5.0	150	13	91	5.2		
DEC	373	12.0	16.9	150	16	90	5.1	140	12	91	4.6		
TOTAL	3991	-	-	-	-	-	-	-	-	-	-	-	-
AVG.		11.0	18.8	140	33	76	5.4	160	16	84	4.8	7.9	3.5
No. of Samples	-	-	-	23	23	-	-	111	117	-	-	18	18

\* Estimated

# BIOCHEMICAL OXYGEN DEMAND

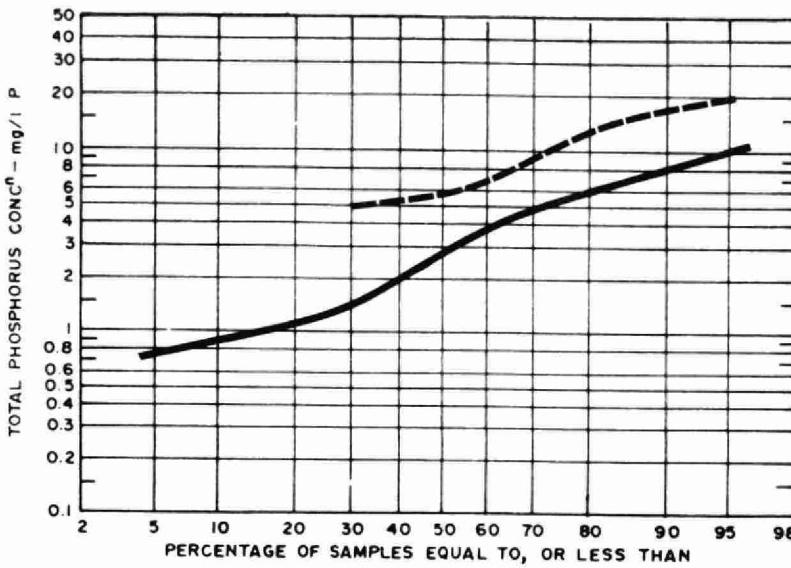


# SUSPENDED SOLIDS



PLANT INFLUENT      ——————  
PLANT EFFLUENT      ————

# PHOSPHORUS



## TREATMENT DATA

MONTH	GRIT	CHLORINATION		AERATION			WASTE SLUDGE			AEROBIC DIGESTER			
		QUANTITY REMOVED	Avg. Dosage	MLSS. Conc.	F/M	AIR USED	Quantity	Suspended Solids	VOL. Solids	Quantity Removed	Suspended Solids	VOL. Solids	Amount Hauled
		cubic feet	10 <sup>3</sup> pounds	mg/l	mg/l	day <sup>-1</sup>	10 <sup>6</sup> gallons	mg/l	%	10 <sup>6</sup> gallons	mg/l	%	cubic yards
JAN	1510			2100	0.47	0.9					4500		
FEB	2270			3400	0.18	1.3					5100		
MAR	2260			4200	0.19	1.2					11000		
APR	2230			4600	0.23	0.7					12000		
MAY	1610			5200	0.17	0.7					14000		
JUNE	2320			5900	0.09	1.0					16000		
JULY	1300			7200							17000		
AUG	1670	10.3	4.5	5900	0.06	3.7	1.1			0.61	24000		3621
SEPT	1620	10.2	4.3	7100			2.2	24000		0.70	23000	99	4184
OCT	1460	4.3	1.3	7000	0.66	2.9	1.7	22000		0.85	27000		5033
NOV	2160	4.2	1.5	6600	0.13	1.2	1.8	19000	72	0.81	27000	69	4808
DEC	2210			7000	0.12	1.1	1.7	25000	73	0.75	26000	71	4452
TOTAL	22620	29.0	-	-	-	-	-	-	-		-	-	22098
AVG.	5.7 cu. ft/mil gal		2.7	5500	0.23	1.5	1.7	23000	73	0.74	17000	80	

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